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The Role of Public Health in Antimicrobial Stewardship in Healthcare

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Abstract

Education, surveillance, and promotion of antimicrobial stewardship align with the goals of public health to prevent disease, promote health, and prolong life. Many US federal and state public health organizations are already engaged in antimicrobial stewardship activities. Healthcare providers are encouraged to work with public health officials on appropriate local antimicrobial stewardship strategies to attain the common goal of reducing antimicrobial resistance and preserving antimicrobials for future generations.

Keywords

antimicrobial resistance; antimicrobial stewardship; public health; surveillance

The rise of antimicrobial resistance, coupled with the limited development of new antimicrobial classes, is one of the most serious and growing public health threats [1, 2]. Antimicrobial-resistant infections that develop in a single healthcare facility, in a single patient, can affect society at large. Public health organizations play a critical role in partnering with healthcare providers (HCPs) and facilities to promote education, surveillance, and prevention strategies to limit the development of antimicrobial resistance.

Specifically, public health organizations are positioned to promote antimicrobial stewardship across all healthcare institutions, preserve antimicrobials for the future, and decrease the demand by the public for, and the adverse events and healthcare costs associated with, inappropriate antimicrobial use [3]. Many strategies to improve antimicrobial use align with the goals of public health, including promoting antimicrobial stewardship strategies,

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facilitating data monitoring and transparency, building infrastructure, and increasing knowledge and awareness at the patient and HCP levels [3]. Promoting antimicrobial stewardship at the federal, state, and local levels is in alignment with the 10 essential services of public health (Table 1) [4].

Furthermore, public health organizations have a unique vantage point across the continuum of care and across regions—providing a global picture that can help inform antimicrobial stewardship strategies at the local level. Public health organizations can also assist healthcare facilities to educate and inform one another of their institution-specific antimicrobial stewardship programs (ASPs). Healthcare facilities and public health organizations may work together to conduct needs assessments in order to develop comprehensive regional ASPs, drawing on the shared resources of the participating institutions and organizations. With financial assistance from the Patient Protection and Affordable Care Act, most state public health departments in collaboration with state-based quality improvement organizations are equipped with infrastructure to provide this service.

At the federal level, the Centers for Disease Control and Prevention (CDC) has been engaged in promoting antimicrobial stewardship activities for the past 15 years through the Get Smart program, which supports principles and actions for optimizing antimicrobial use in inpatient and outpatient settings [5]. Two recent CDC reports focused on the impact of antimicrobial resistance in the United States and the magnitude, variation, and potential for improvement of antimicrobial use in hospitals [6, 7]. Accompanying the latter report is a document describing the core elements of hospital-based ASPs to assist healthcare facilities with addressing appropriate antimicrobial use and surveillance [8]. The CDC has also developed a surveillance mechanism for facilities to report and analyze antimicrobial use as part of the National Healthcare Safety Network [9].

The CDC's Get Smart program is also engaged in assisting organizations and healthcare facilities with educating the public on appropriate antimicrobial use. They have produced a variety of print and video materials to describe antimicrobial resistance and appropriate antibiotic use for upper respiratory infections in simple terms [10]. Many US state and local health departments have also been engaged at the consumer level, including the Indiana State Department of Health and the Marion County Public Health Department, which formed the Indiana Coalition for Antibiotic Resistance Education Strategies (ICARES) [11]. ICARES is a group of community members formed in 1999 to inform physicians and patients about the potential harm associated with unnecessary antibiotic use through an educational website with resources, links, and printable material [11]. The Michigan Antibiotic Resistance Reduction (MARR) Coalition was formed in 1997 to help reduce unnecessary antibiotic prescribing in Michigan. Since then, they have grown to include a broad coalition of local professional and community organizations, and individuals focused on the issue of unwarranted use of antibiotics in treating self-limiting respiratory ailments such as colds, flu, and most coughs [12]. The MARR coalition specifically provides consumer educational programs about appropriate antibiotic use, interventions to improve patient communication skills, and a forum for bringing together stake-holders who share the goal of antimicrobial resistance reduction [12].

Many US state public health departments are engaged in anti-microbial stewardship activities in the healthcare sector beyond educating the public. In a July 2013 Association of State and Territorial Health Officials survey, 25 state health departments in the United States reported engaging healthcare facilities and HCPs in antimicrobial stewardship activities including education/training, surveys, guidelines, communications, collaboratives, and demonstration projects [13]. For example, the California Department of Public Health's Antimicrobial Stewardship Program Initiative conducted and disseminated the results of a statewide assessment of ASPs in healthcare facilities, facilitated a small hospital and rural hospital ASP collaborative, and educated numerous hospitals and long-term-care facilities on the benefits of appropriate antimicrobial use [14–16]. In addition to creating a campaign entitled “Stop Antibiotic Misuse in Minnesota” and reporting select pathogen antimicrobial susceptibility patterns annually from participating laboratories, the Minnesota Department of Public Health developed the *Minnesota Guide to a Comprehensive Antimicrobial Stewardship Program* with their Antimicrobial Stewardship Steering Group that can assist in the development and implementation of an ASP, specifically taking into consideration the variation in financial and personnel resources within facilities [17]. Oregon's Patient Safety Commission, in collaboration with the Oregon Health Authority, also implemented an ASP initiative that included on-site and webinar-based trainings, site visits to participating hospitals by experienced ASP physicians and pharmacists, monthly conference calls, and a baseline and follow-up antimicrobial stewardship activity survey that included data collection on antimicrobial utilization and hospital-onset *Clostridium difficile* rates [18]. The Georgia Department of Public Health convened an Antibiotic Stewardship Committee to establish the framework for statewide activities, conducted a needs assessment and focus groups, created training programs for physician and pharmacist ASP champions, and developed professional partnerships engaging the entire healthcare community in improving antimicrobial use [19].

Antimicrobial stewardship fits squarely within the focus of public health to prevent disease, promote health, and prolong life [20]. Public health must educate consumers on appropriate antimicrobial use, allowing HCPs the option of not prescribing an antibiotic. HCPs are encouraged to engage public health officials in the common goal of reducing antimicrobial resistance and preserving antimicrobials for future generations. Likewise, public health organizations are encouraged to connect with HCPs and institutions within their jurisdictions in conducting ASP needs assessments, collecting antimicrobial susceptibility and utilization data, and then providing the regional perspective to help inform local practices. Antimicrobial resistance is not limited to one institution; patients live in communities and come into contact with multiple healthcare institutions. Therefore, a population-based approach that involves public health organizations is essential to address antimicrobial resistance and promote antimicrobial stewardship in healthcare comprehensively.

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Table 1.

Antimicrobial Stewardship Aligns With the 10 Essential Services of Public Health

1.	Monitor and detect antimicrobial susceptibility patterns and antimicrobial utilization trends at the national, state, regional, and community levels.
2.	Diagnose and investigate concerning patterns and trends in antimicrobial susceptibility across nations, states, regions, and communities.
3.	Inform, educate, and empower patients, healthcare providers, and state survey agencies on appropriate antimicrobial use.
4.	Partner with community organizations including but not limited to hospitals, long-term-care facilities, healthcare systems, and patient safety organizations in promoting antimicrobial stewardship strategies across regions, particularly with shared patient populations.
5.	Identify best practices and policies in antimicrobial stewardship and share them widely.
6.	Advocate for legislation to improve patient safety and protect the public's health by limiting development of resistant infections.
7.	Link healthcare facilities with each other to enhance antimicrobial stewardship across regions.
8.	Assure competent antimicrobial stewardship programs in healthcare facilities.
9.	Evaluate and improve antimicrobial stewardship programs in healthcare facilities.
10.	Research innovative solutions to barriers in antimicrobial stewardship implementation.

Based on the 10 Essential Public Health Services of the National Public Health Performance Standards [4].